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| 10/088,913 | 05/07/2002 | Michael O. Thompson | 3672-0144P | 8909 |
| 2292 7590 09/28/2007 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747 | | | EXAMINER HUR, JUNG H | |
| | | | ART UNIT 2824 | PAPER NUMBER |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary

Application No.

10/088,913

Applicant(s)

THOMPSON ET AL.

Examiner

Jung (John) H. Hur

Art Unit

2824

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 6-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 12-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Amendment

1. Acknowledgment is made of applicant's Amendments, filed 23 July 2007. The changes and remarks disclosed therein have been considered.

No claims have been cancelled or added by Amendment. Therefore, claims 1-18 are pending in the application.

Claims 6-11 remain withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected invention and species, there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1, 13, 14, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuroda (U.S. Pat. No. 5,487,029) in view of Clemons (U.S. Pat. No. 4,599,709).**

Regarding claims 1, 13 and 17, Kuroda, for example in Figs. 1 and 2, discloses a non-volatile passive matrix memory device comprising ferroelectric memory cells (for example, C0-C7 in Fig. 2); word lines (for example, W00-W07 in Fig. 2) and bit lines (for example, D0-D7 in Fig. 2) that are orthogonal to each other, where each memory cell is at all times in physical

contact with a word line and a bit line (for example, in Fig. 2, the memory cell C0 is directly connected to or is directly contacting the word line W00 and the bit line D0; i.e., a transistor is not used to make a connection or contact to a word line or a bit line); the word lines divided into a number of segments (for example, BLOCK (0,0) through BLOCK (0,7) in Fig. 1), each segment comprising and being defined by a plurality of adjoining bit lines (for example, D0-D7 for BLOCK (1,0)); each word line in a segment is differentiated based on the position of the word line within the segment (i.e., in different row positions), each word line in the segment being adjointed to a separate bit line (i.e., in a matrix structure); a plurality of sensing means (for example, SA in WRC0-WRC7), each being adapted for sensing the charge flow in the bit line connected therewith in order to determine a logical value stored in the memory cell defined by the bit line (see, for example, column 12, lines 42-54).

However, Kuroda does not disclose means for connecting each separate bit line assigned to a segment with a different associated sensing means, such that a word line of the same position within each segment is selected within each segment, each word line of the same position being sensed at the same time by said respective different associated sensing means, thus enabling simultaneous connection of all memory cells assigned to a word line on a segment for readout via the corresponding bit lines of the segment.

Clemons, for example in Figs. 2 and 3, discloses a means (for example, via T200-T203 controlled by BYTE BLOCK DECODER) for connecting each separate bit line (for example, bit lines for columns C11-C14) assigned to a segment (for example, BYTE BLOCK 1, when selected) with a different associated sensing means (for example, SA1-SA4 via I/O SWITCHES in Fig. 3), such that the word line of the same position within each segment is selected within

each segment (i.e., for example, a selected word line within BYTE BLOCK 1), each word line of the same position being sensed at the same time by said respective different associated sensing means (for example, SA1-SA4 via I/O SWITCHES in Fig. 3), thus enabling simultaneous connection of all memory cells (for example, M111 - M114) assigned to a word line (for example, R1) on a segment (for example, BYTE BLOCK 1) for readout via the corresponding bit lines (for example, bit lines for columns C11 - C14) of the segment.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Kuroda by incorporating the means of Clemons for connecting each bit line assigned to a segment with an associated sensing means, thus enabling simultaneous connection of all memory cells assigned to a word line on a segment for readout via the corresponding bit lines of the segment, as an equivalent alternative means for segmenting and simultaneously accessing a byte (or a word or other widths of bits) of information from the memory (compare with Fig. 1 of Clemons, which is similar to the configuration of Kuroda), for the purpose of having a ferroelectric memory organization that provides for improved utilization of spare columns, while allowing for subdivision of the memory into portions (see Clemons column 3, lines 40-43).

Regarding claims 14 and 16, the above Kuroda/Clemons combination further discloses that the number of sensing means is equal to the number of bit lines within each segment (for example, Figs. 2 and 3 of Clemons, as applied to the above combination, show 4 sensing means SA1-SA4 for 4 bit lines within each segment or BYTE BLOCK), where each segment contains the same number of bit lines (for example, 4 bit lines in each BYTE BLOCK in Fig. 2 of

Clemons), such that each bit line in each segment (when selected) is sensed at a different sensing means (via corresponding SA1-SA4 in Fig. 3 of Clemons).

4. Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuroda (U.S. Pat. No. 5,487,029) in view of Clemons (U.S. Pat. No. 4,599,709) as applied to claim 1 above, and further in view of Dierke (U.S. Pat. No. 5,734,615).

Regarding claim 2, the combination of Kuroda and Clemons discloses a non-volatile passive matrix memory device as in claim 1 above, with the exception of the simultaneous connection of each bit line of a segment with the associated sensing means during addressing is accomplished by multiplexers.

Dierke, for example in Fig. 7, discloses multiplexers (42-0' through 42-7') for simultaneously connecting (since multiplexers are commonly controlled) each bit line of a segment (three segments defined by BIT 0-7, BIT 8-15 and BIT 16-23) with an associated sensing means (at the output of each multiplexer).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to substitute the multiplexing means of Dierke for the multiplexing means of Clemons, since both means are equivalent for simultaneously connecting bit lines of a segment with an associated sensing means, for the purpose of having a ferroelectric memory organization that provides for improved utilization of spare columns, while allowing for subdivision of the memory into portions (see Clemons column 3, lines 40-43), and the selection of these equivalents would be within the level of ordinary skill in the art.

Regarding claims 3-5, the above Kuroda/Clemons/Dierke combination further discloses that the number of multiplexers corresponds to the largest number of bit lines defining a segment (in Fig. 7 of Dierke, eight bit lines per segment; when adapted for Clemons with four multiplexers; see Clemons, Fig. 2), each bit line of a segment being connected with a 3 multiplexer (see Dierke, Fig. 7 in which BIT 0-7, for example, are connected to the respective multiplexers); wherein the output of each multiplexer is connected with a signal sensing means (inherent in Dierke, Fig. 7; SA1-SA4 in Fig. 3 of Clemons); wherein the signal sensing means is a sense amplifier (SA1-SA4 in Fig. 3 of Clemons).

5. Claims 12, 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuroda (U.S. Pat. No. 5,487,029) in view of Clemons (U.S. Pat. No. 4,599,709) as applied to claim 1, 14 and 17 above, and further in view of Seyyedy (U.S. Pat. No. 5,969,380).

Regarding claims 12, 15 and 18, the combination of Kuroda and Clemons discloses a non-volatile passive matrix memory device as in claims 1, 14 and 17 above, with the exception of a volumetric data storage apparatus with a plurality of stacked layers, each layer comprising one of said non-volatile passive matrix memory devices. Seyyedy, for example in Figs. 1 and 2, discloses a ferroelectric volumetric data storage apparatus with a plurality of stacked layers (for example, four layers in Fig. 1 and three layers in Fig. 2), each layer comprising one of non-volatile passive matrix memory devices (planar ferroelectric memory arrays). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to stack a plurality of devices (as discloses in the above combination of Kuroda and Clemons) in a

volumetric data storage apparatus, as in Seyyed, for the purpose of increasing the density of memory cells over a given substrate area.

Response to Arguments

6. Applicant's arguments filed 23 July 2007 have been fully considered but they are not persuasive.

In response to Applicant's argument, in the top paragraph on page 12, regarding the Kuroda's means for addressing and sensing memory cells, it is noted that Kuroda in combination with Clemons would disclose reading simultaneously all memory cells in a word line segment. Also, it is noted that the invention of Clemons was disclosed as an improvement over the "prior art" embodiment in Fig. 1 of Clemons, which is similar to that of Kuroda.

In response to Applicant's argument, in the bottom paragraph on page 12, that the Clemons and Kuroda disclose different types of memory, it is note that Clemons was cited as a secondary reference that discloses a means for simultaneously sensing all the bit lines in a word line segment, which one of ordinary skill in the art would recognize as being applicable to various types of memory with an array of memory cells with word lines and bit lines, including the ferroelectric memory of Kuroda. Also, it is noted that the invention of Clemons was disclosed as an improvement over the "prior art" embodiment in Fig. 1 of Clemons, which is similar to that of Kuroda.

In response to Applicant's argument, starting in the middle paragraph on page 13 and in the intervening paragraph between pages 13 and 14, that in Clemons, "The addressing of the voltage on the bit lines to specific sense amplifiers is not based on segmentation of the word

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lines” (in the middle paragraph on page 13), it is noted that Clemons in Figs. 2 and 3 does disclose a word line segmentation as understood in view of Figs. 5 and 6 of the instant application (see as a reference the first response in the previous Office Action).

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jung (John) H. Hur whose telephone number is (571) 272-1870. The examiner can normally be reached on M-F 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on (571) 272-1869. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jhh

/Jung (John) H. Hur/
Primary Patent Examiner, Art Unit 2824
18 September 2007